Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 16 (3): 553–561
https://doi.org/10.15560/16.3.553

PENSOFT

Additions to terrestrial flora of Tunisia: occurrence and taxonomic notes

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Abstract

We document new records of 11 vascular taxa. Some were found in the wild for the first time and, therefore, are new reports to terrestrial flora of Tunisia. One species, *Ranunculus acris* L., is reported for the first time for North Africa. *Parietaria cretica* L. is confirmed for North Africa. Details about the distribution and habitats of the 11 species are provided, and comments on their status and taxonomy are included.

Keywords

New records, chorology, taxonomy, North Africa.

Academic editor: Navendu Page | Received 25 November 2019 | Accepted 20 April 2020 | Published 13 May 2020

Citation: El Mokni R, Domina G (2020). Additions to terrestrial flora of Tunisia: occurrence and taxonomic notes. Check List 16 (3): 553–561. https://doi.org/10.15560/16.3.553

Introduction

In continuation with our previous research in which we discover indigenous and non-native vascular plants in Tunisia and North Africa (e.g. El Mokni et al. 2014, 2015a, 2015b, 2015c; El Mokni and Iamonico 2018a, 2018b; Iamonico and El Mokni 2019a, 2019b; El Mokni and Domina 2019; El Mokni and Verloove 2019), we present new chorological data for 11 taxa, mostly recorded during the last five years in the provinces of Ariana, Beja, Bizerta, Jendouba, Monastir, and Zaghouan.

Methods

Our work is based on extensive field surveys, an analysis of the literature, and the examination of specimens kept in the herbaria P, PAL-Gr, and PAL (acronyms according to Thiers 2020). All our herborized specimens were deposited in the Ridha El Mokni herbarium in the Faculty of Sciences of Bizerta (FSB) and/or in the Ridha El Mokni herbarium of the Faculty of Pharmacy of Monastir (FPHM). Duplicates of some specimens are also deposited in P, PAL-Gr, and PAL. In Results, taxa are grouped

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together as either indigenous or non-native and within each group are arranged in alphabetical order by families, genera, and species. The nomenclature mostly follows recent sources (APD 2020; Euro+Med PlantBase 2020).

Results

Indigenous flora

Alismataceae

Alisma gramineum Lej.

= *Alisma arcuatum* Michalet
= *Alisma plantago-aquatica* subsp. *arcuatum* (Michalet) Asch. & Graebn.

Figure 1A

New records. TUNISIA: Bizerta, Sejnane/Teskraya, NE Tunisia, 37°14′33″N, 009°43′05″E; 20 m a.s.l.; 3 May 2015; *R. El Mokni* (El Mokni-FPHM-13/03052015) • Ibid., 37°14′43″N, 009°44′57″E; 30 m a.s.l.; 17 May 2017; *R. El Mokni* (El Mokni-FPHM-08/17052017) • Ibid., 37°12′02″N, 009°37′32″E; 10 m a.s.l.; 17 May 2017, *R. El Mokni* (El Mokni-FPHM-17/17052017, PAL).

Global distribution. *Alisma gramineum* (Ribbon-leaved Water-plantain) is native to North Africa where it has a large distribution. It is widespread across temperate and subarctic portions of Europe, Asia, and in the Mediterranean basin (Lansdown 2014). In Europe, it is native to nearly all territories except for the Iberian Peninsula, Ireland, a large part of Scandinavia, Albania, and Macedonia (Uotila 2009a). In North Africa, *A. gramineum* was, until now, known from Morocco, Lybia, and Egypt (Uotila 2009a; APD 2020). We report this species for the first time from Tunisia.

Identification. *Alisma gramineum* presents a style shorter than, or equal to, the ovary; anthers are ovoid to rounded; achenes have two abaxial grooves and one abaxial ridge; leaves are submersed, ribbonlike, or, if emersed, blades are linear-lanceolate to narrowly elliptical. These species are recognized as separate (WCSP 2020).

Habitat. *Alisma gramineum* is an annual plant. In Tunisia, it occurs in small populations along the margins of some rivers of Sejnane, Bizerta region (Fig. 2).

Araceae

Lemna minuta Kunth

= *Lemna minuscula* Herter

New records. TUNISIA: Jendouba, Béni Métir, NW Tunisia; 36°41′49″N, 008°42′53″E; 440 m a.s.l.; 13 May 2008; *R. El Mokni* (El Mokni-FSB-02/13052008) • Bizerta, Jarzouna, NE Tunisia; 37°15′43″N, 009°53′35″E; 0 m a.s.l.; 23 May 2010; *R. El Mokni* (El Mokni-FSB-14/23052010) • Bizerta, Bizerta City/Ain Meriam, NE Tunisia; 37°17′40″N, 009°52′15″E; 0 m a.s.l.; 17 May 2014; *R. El Mokni* (El Mokni-FSB-25/17052014).

Global distribution. *Lemna minuta* is native to subtropical and temperate areas from South America through Central America and the West Indies and along the high mountains to Mexico and California (Flora of North America 2008; Armstrong 2009). The species is very common throughout the southeastern and southwestern USA (USDA-ARS 2009), with scattered occurrences in central USA (Larson and Searcy 2007; Flora of North America 2008). It was first recorded in France in 1965 (Jovet and Jovet-Ast 1966) and then introduced elsewhere in western Europe and Japan (Landolt 1986; Reveal 1990; Wolff 1991). This species is expected to be elsewhere (Reveal 1990; Landolt 2000) because it is almost certainly under-recorded due to its similarity with *L. minor* L. (Preston and Croft 1997; Ceschin et al. 2016a). It is now present, in most European countries (Hussner 2012), where it is considered a casual alien (Global Compendium of Weeds 2007) to a noxious weed (Branquart et al. 2007). *Lemna minuta* has not been reported before from North Africa (Uotila 2009b; APD 2020). We report it for the first time from Tunisia and North Africa.

Identification. *Lemna minuta* (Least Duckweed) is similar to *L. minor*, but *L. minuta* shows single, elliptical, flat, symmetric fronds that are oval-oblong in outline. Fronds of *L. minuta* are always characterized by the existence of only one vein on the upper side versus three veins clearly seen at the upper side of a wider frond in *L. minor* (Flora of North America 2008; Banaszak and Musial 2009; Ceschin et al. 2016b).

Habitat. *Lemna minuta* is an annual plant. In northern Tunisia, it occurs in free small populations floating in some rivers in the Jendouba and Bizerta regions (Fig. 2).

Orobanchaceae

Orobanche cumana Wallr.

≡ *Orobanche cernua* subsp. *cumana* (Wallr.) Soó

Figure 1K

New records. TUNISIA: Beja, Beja towards Nefza, NW Tunisia; 36°46′13″N, 009°11′28″E; 180 m a.s.l.; 8 Jul. 2014; *R. El Mokni* (El Mokni-FSB-37/08082014) • Beja, Amdoun-Route d'Aîn Draham, NW Tunisia; 36°44′15″N, 009°03′14″E; 260 m a.s.l.; 21 Jul. 2018; *R. El Mokni & G. Domina* (El Mokni-FPHM-33/21082018, PAL-Gr, PAL).

Global distribution. *Orobanche cumana* (Sunflower Broomrape), which is parasitic on sunflower (*Helianthus annuus* L.), is the greatest constraint to the production of sunflower seeds, except in the Americas (Molinero-Ruiz et al. 2015). *Orobanche cumana*, which was a parasite of *Artemisia* spp., was first found to be parasitic on sunflower in the first half of the 19th century in Russia (Antonova 2014). Thereafter, *O. cumana* spread around the world with the expansion of the sunflower crops. Currently, *O. cumana* is present in all areas of southern Europe and around the Black Sea where sunflowers are grown (Antonova 2014; Batchvarova 2014; Duca 2014; Hargitay 2014; Jestin et al. 2014; Kaya 2014; Miladinovic

Figure 1. Some newly recorded plants from Tunisia. **A.** *Alisma gramineum* (Bizerta). **B, C.** *Persicaria maculosa* (Bizerta and Jendouba). **D.** *Moluccella laevis* (Jendouba/Beja). **E, F.** *Plantago major* subsp. *intermedia* (Jendouba). **G.** *Parietaria cretica* (Zaghouan). **H, I.** *Lysimachia foemina* (Monastir) with details of the margin of a petal showing typical four-celled gland (all cells of equal size). **J.** *Matthiola incana* subsp. *incana* (Bizerta). **K.** *Orobanche cumana* (Beja). Photos credits: Ridha El Mokni. Scale bars: A, B, D = 15 cm; C = 20 cm; E, J, K = 10 cm; F, G = 2.5 cm; I = 1.5 cm; H = 0.15 cm.

et al. 2014; Molinero-Ruiz and Dominguez 2014; Pacureanu 2014; Pototskyi 2014), China (Ma and Jan 2014; Shi et al. 2015), and North Africa (Amri et al. 2012). We report *O. cumana* for only the second time from Tunisia.

Identification. *Orobanche cumana* is closely related to *O. cernua* Loefl., and Román et al. (2003) considered the two taxa as conspecific. These species differ morphologically with respect to plant height and build, length and structure of their inflorescences (dense, seldom lax at the base for *O. cernua* versus lax, sometimes dense at the apex for *O. cumana*), calyx segments, corolla length, and colour (Pujadas-Salvà and Velasco 2000). Moreover, these species are characterized by contrasting seed oil fatty acid profiles, with high oleic acid concentration in *O. cernua* versus high linoleic acid concentration in *O. cumana* (Pujadas-Salvà and Velasco 2000).

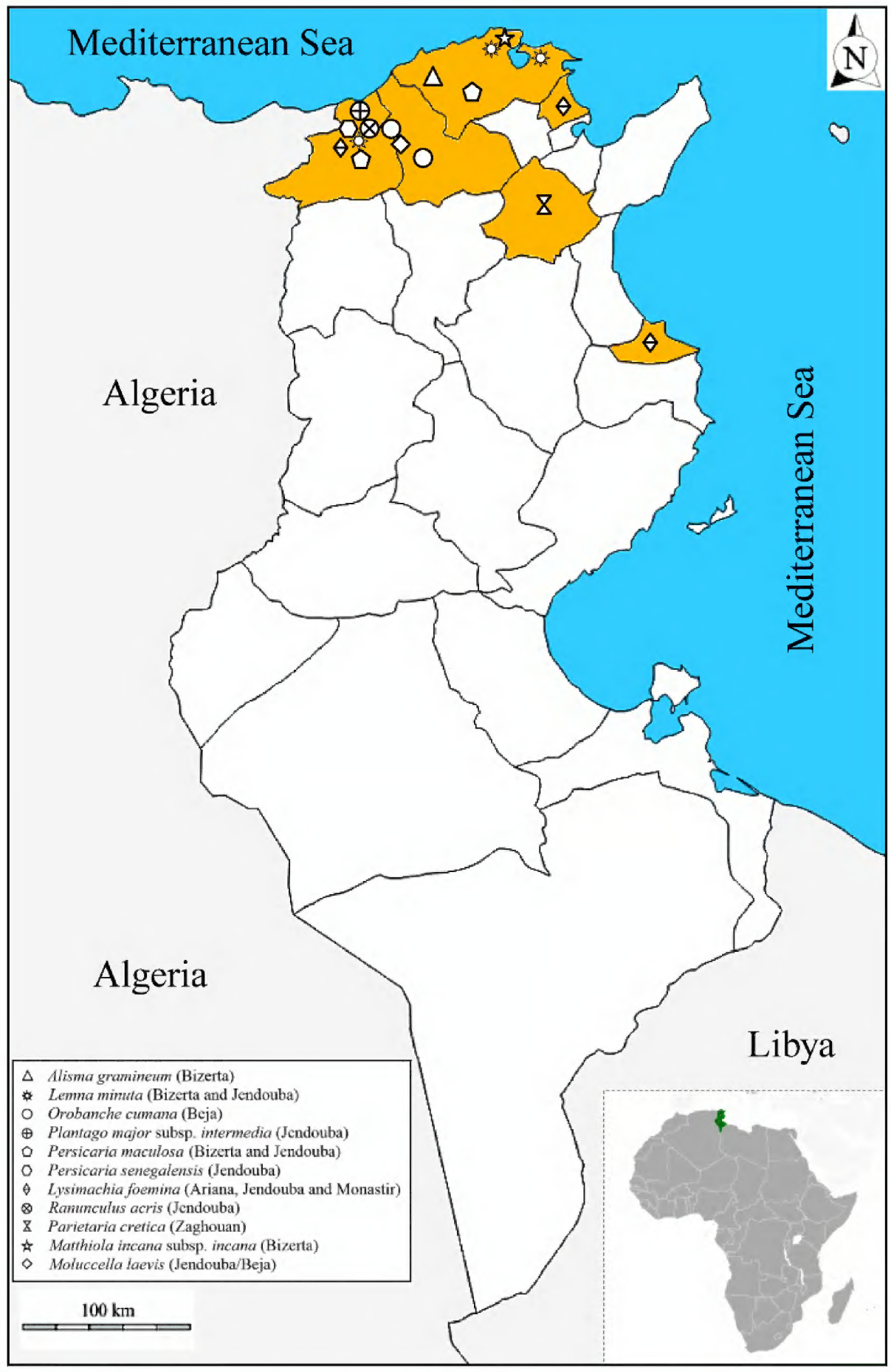

Figure 2. Geographic distribution of *Alisma gramineum*, *Lemna minuta*, *Orobanche cumana*, *Plantago major* subsp. *intermedia*, *Persicaria maculosa*, *P. senegalensis*, *Lysimachia foemina*, *Ranunculus acris*, *Parietaria cretica*, *Matthiola incana* subsp. *incana*, and *Moluccella laevis* in Tunisia.

Habitat. *Orobanche cumana* is a parasitic annual plant. It occurs in very large populations in sunflower crops in Beja and Jendouba regions, northwestern Tunisia (Fig. 2).

Plantaginaceae

***Plantago major* subsp. *intermedia* (Gilib.) Lange**
≡ *Plantago intermedia* Gilib.
Figure 1E, F

Material examined/new records. TUNISIA: Beja, Hammam Seiala, NW Tunisia; 36°40′46″N, 009°09′ 38″E; 250 m a.s.l.; 22 May 2015; *R. El Mokni* (El Mokni-FPHM-17/22052015) • Jendouba, Tabarka, NW Tunisia; 36°57′17″N, 008°45′30″E; 10 m a.s.l.; 21 Sept. 2016; *R. El Mokni* (El Mokni-FPHM-41/21092016) • Ibid., 36°58′12″N, 008°52′14″E; 50 m a.s.l.; 26 Jan. 2018; *R. El Mokni* (El Mokni-FPHM-07/26012018). • Ibid., 36°57′ 15″N, 008°45′10″E; 10 m a.s.l.; 28 Sept. 2018; *R. El Mokni* (El Mokni-FPHM-52/28092018) • Kairouan, Aïn Cherichira, Ouest de Keirouan; 20 Jun. 1883, *M.M. E. Cosson* et al. (P 04993631!).

Global distribution. *Plantago major* subsp. *intermedia* is widespread in Europe (Marhold 2011a). In North Africa, the subspecies has been known from Morocco, Algeria, and Egypt (Marhold 2011a; APD 2020). We report it for the first time from Tunisia.

Identification. *Plantago major* subsp. *intermedia* differs from *P. major* L. subsp. *major* by the characters of the leaves, capsules, and seeds. In the first, leaves are 3–5 veined and broadly cuneate at the base. The capsules contain 9(–14)–25(–36) seeds that are (0.6)0.8–1.2(–1.5) mm long. In the later, leaves are 5–9 veined,

broadly subcordate to rounded at the base, capsules contain about 4–15 seeds that are (1.0)1.2–1.8(-2.1) mm long (Clive 2010).

Habitat. *Plantago major* subsp. *intermedia* a ruderal plant that occurs in small populations growing in the margins of some coastal rivers of Tabarka (Jendouba) and Hammam Seiala (Beja) regions, northwestern Tunisia (Fig. 2). The subspecies was collected at Aïn Cherichira near Qayranwan at the end of the 19th century.

Polygonaceae

***Persicaria maculosa* Gray**
≡ *Polygonum persicaria* L.
Figure 1B, C

New records. TUNISIA: Bizerta, Bizerta City/Ain Meriam, NE Tunisia; 37°17′26″N, 009°52′24″E; 0 m a.s.l.; 3 May 2015; *R. El Mokni* (El Mokni-FSB-02/03052015) • Jendouba, Fernana/Bouhertma, NW Tunisia; 36°40′28″N, 008°45′01″E; 200 m a.s.l.; 5 Jul. 2016; *R. El Mokni* (El Mokni-FPHMB-22/05082016) • Bizerta, Mateur/Joumine, NE Tunisia; 36°57′35″N, 009°31′49″E; 100 m a.s.l.;17 May 2017; *R. El Mokni* (El Mokni-FPHM-44/17052017, PAL).

Global distribution. *Persicaria maculosa* (Redshank, Spotted Ladysthumb) is native to temperate Eurasia and North Africa (Uotila 2017). It subsequently was introduced to Asia, New Zealand, Australia, and the USA (Hultén 1968). In North Africa, *P. maculosa* has been reported from Morocco, Algeria, and Egypt (Uotila 2017; APD 2020). We report it from Tunisia for the first time.

Identification. Compared to *Persicaria amphibia* (L.) Delarbre, *P. maculosa* is annual, without rhizomes or stolons. *Persicaria maculosa* has dense, erect inflorescences (inflorescences mostly arching or nodding in *P. lapathifolia*) with ciliate margins of ocrea and bristles (0.2–)1–12 mm long, mostly overlapping ocreolae, narrowly ovate or ovate-lanceolate to linear-lanceolate leaf blades; bristles of the ocreolae 0.2–1.3(–2) mm long, 2 or 3 styles, and discoid achenes which are biconvex, or trigonous.

Habitat. *Persicaria maculosa* is an annual plant that occurs in small populations growing in the margins of some rivers of Sejnane and Mateur-Joumine in Bizerta region, northeastern Tunisia, and Bouhertma in Fernana region, northwestern Tunisia (Fig. 2).

***Persicaria senegalensis* (Meisn.) Soják**
≡ *Polygonum senegalense* Meisn.
= *Polygonum senegalense* var. *numidicum* Maire

New records. TUNISIA: Jendouba, Tabarka, NW Tunisia; 36°56′22″N, 008°47′12″E; 0 m a.s.l.; 1 Aug. 2017; *R. El Mokni* (El Mokni-FPHM-32/01082017) • Ibid., 36°56′22″N, 08°47′12″E; 0 m a.s.l.; 03 Aug. 2018; *R. El Mokni* (El Mokni-FSB-12/03082018).

Global distribution. This species occurs more or less throughout Africa, from North Africa south to the Cape, as well as in Yemen and in Madagascar (Lansdown and de Bélair 2013). It is naturalized in Crete (Greece) and in Sicily and Pantellaria (Italy) (Galasso et al. 2018). In North Africa, *P. senegalensis* has been reported from Morocco, Algeria, and Egypt (Uotila 2017; APD 2020). We report it from Tunisia for the first time.

Identification. *Persicaria senegalensis* is a perennial herb (*P. maculosa* Gray is an annual without rhizomes or stolons) with erect glabrous to woolly white stems, rooting at the lower nodes. Leaves are alternate, simple, subsessile or borne on a petiole 1–7 cm long and often reddish, with a cylindrical ochrea that is up to 4 cm long. The blade is lanceolate, up to 30 cm long and 8 cm wide, the lower surface shows numerous small glands and often covered with stiff hairs on the midrib and the margin. *Persicaria senegalensis* shows inflorescences in panicles of one to several spike-like clusters, each about 10 cm long (inflorescences mostly arching or nodding in *P. lapathifolia*), with pink, greenish, or white flowers. Achenes are lenticular nuts 2.5–3.5 mm long and shiny black.

Habitat. *Persicaria senegalensis* is a naturalized species in Tunisia. It occurs in large populations among the hydrophytes of the Oued El Kébir river in Tabarka region, northwestern Tunisia, not far from the Algerian border (Fig. 2).

Primulaceae

***Lysimachia foemina* (Mill.) U. Manns & Anderb.**
≡ *Anagallis foemina* Mill.
≡ *Anagallis arvensis* subsp. *foemina* (Mill.) Schinz & Thell.
Figure 1H, I

New records. TUNISIA: Monastir, Monastir City, CE Tunisia; 35°46′21″N, 010°49′50″E; 20 m a.s.l.; 27 Feb. 2019; *R. El Mokni* (El Mokni-FPHM-18/27022019) • Ibid., 25 Mar. 2019; *R. El Mokni* (El Mokni-FPHM-72/25032019); Ariana, INSAT, NE Tunisia; 36°50′34″N, 010°11′54″E; 10 m a.s.l.; 3 Mar. 2019; *R. El Mokni* (El Mokni-FPHM-21/03032019) • Jendouba, Beni M'Tir, NW Tunisia; 36°44′46″N, 008°44′23″E; 430 m a.s.l.; 23 Mar. 2019; *R. El Mokni* (El Mokni-FPHM-67/23032019).

Global distribution. *Lysimachia foemina* is native to central and southern Europe, northern and eastern Asia, North and South America, and western Australia (Pignatti 1982). In North Africa, it is reported as native only in Morocco (Marhold 2011b; APD 2020). We report this species from Tunisia for the first time; this is its second report from North Africa.

Identification. This species can be confused with *Lysimachia arvensis* (L.) U. Manns & Anderb. Marsden-Jones and Weiss (1938) found that the corolla lobe margins in *L. arvensis* is fringed with a large number of three-celled glands, where the top cell is enlarged, whereas *L. foemina* has a fewer four-celled glands, with all cells of equal size (Fig. 1H). Moreover, *L. foemina* can be distinguished from *L. arvensis* on the basis of the

hairiness and arrangement of the petals and by the length of the flower stalk. In fact, *L. foemina* shows few glandular hairs on the margin of the petals and are clearly separated one from another, never imbricate. Furthermore, the flower stalk is shorter, up to 1 cm long. The flower colour is not a diagnostic character (Pignatti 1982). Manns and Anderberg (2007) found that *L. foemina* is more closely related to *L. monelli* (L.) U. Manns & Anderb. than to *L. arvensis* but *L. foemina* and *L. monelli* should be treated as a separate species.

Habitat. *Lysimachia foemina* is an annual species that grows in small ruderal populations in scrub, uncultivated soils, and grasslands of many regions of Tunisia but mainly in Monastir, central Tunisia, where it was first discovered (Fig. 2).

Ranunculaceae

***Ranunculus acris* L.**
≡ *Ranunculus napellifolius* Crantz

New record. TUNISIA: Jendouba, Tabarka, NW Tunisia; 36°56′48″N, 008°46′55″E; 10 m a.s.l.; 29 Apr. 2018; *R. El Mokni* (El Mokni-FPHM-16/29042018).

Global distribution. *Ranunculus acris* (Tall Buttercup, Meadow Buttercup) native to central and northeastern Europe where it is a weed of old pastures and hay meadows (Jacobs et al. 2010). In USA and Canada, it has been reported in all but eight states and provinces (Jacobs et al. 2010). In North Africa, *R. acris* has not previously been recorded (Hörandl and Raab-Straube 2015). We report this species for the first time from Tunisia and North Africa.

Identification. Compared to *Ranunculus macrophyllus* var. *corsicus* (DC.) Briq., *R. acris* shows glabrous receptacles (versus hairy) and compressed globose to roundish glabrous achenes, which usually have a prominent keel and a straight short beak (versus barely curved) at the tip (Jacobs et al. 2010).

Habitat. *Ranunculus acris* is a rhizomatous plant that occurs in small populations growing at the margins of water puddles and the El-Kébir river in Tabarka, Jendouba region (Fig. 2).

Urticaceae

***Parietaria cretica* L.**
Figure 1G

New record. TUNISIA: Zaghouan, Djebel Zaghouan, NE Tunisia; 36°22′1″N, 010°05′59″E; 360–550 m a.s.l.; 23 Apr. 2017; *R. El Mokni* (El Mokni-FPHM-03/23042017).

Global distribution. *Parietaria cretica* (Cretan Pellitory-of-the-wall) is native to Greece (including Crete and the northeastern Aegean Islands), Sicily, and Libya (Tutin et al. 1996; Dobignard and Chatelain 2013; Dimopoulos et al. 2013). In North Africa, *P. cretica* has so far been known only from Lybia (Uotila 2011; APD 2020). We reported it for the first time in Tunisia; this is the second report from North Africa.

Identification. *Parietaria cretica* differs from the closely related *P. lusitanica* L. mainly in having leaves not more than 1 cm long and bracts becoming brown, hard, and connate, forming a five-lobed involucre around the achene (Tutin et al. 1996).

Habitat. *Parietaria cretica* is an herbaceous species that occurs in small chasmophytic populations on cliffs in the Zaghouan Mountains, northeastern Tunisia (Fig. 2).

Non-native flora

Brassicaceae

Matthiola incana* (L.) R.Br. subsp. *incana
≡ *Cheiranthus incanus* L.
≡ *Matthiola incana* (L.) R. Br. subsp. *incana*
Figure 1J

New records. TUNISIA: Bizerta, Bizerta City, NE Tunisia; 37°16′45″N, 009°52′36″E; 10 m a.s.l.; 5 Jul. 2016; *R. El Mokni* (El Mokni-FPHB-07/05082016) • Bizerta, Cap-Blanc, NE Tunisia; 37°19′51″N,0 09°51′53″E; 10 m a.s.l.; 30 Jan. 2018; *R. El Mokni* (El Mokni-FPHB-05/30012018) • Ibid., Cap-Blanc, NE Tunisia; 37°19′51″N, 009°51′53″E; 10 m a.s.l.; 20 Jun. 2018; *R. El Mokni* (El Mokni-FPHB-19/20062018).

Global distribution. *Matthiola incana* subsp. *incana* (Gillyflower) is native to Europe (Al-Shehbaz 2012; Marhold 2011c). Cultivated worldwide (Asia: China, India, Saudi Arabia, Turkey; Africa) for its attractive, highly scented flowers (Al-Shehbaz 2010). It has naturalized in Mexico (Al-Shehbaz 2012). Populations occurring in southern Italy are believed to be re-introductions to the wild of plants cultivated for generations as ornamentals (Simchez et al. 2005). In North Africa, the subspecies is known from Morocco and Lybia as an alien, with unknown status, and from Algeria, where it is naturalized (Marhold 2011c; Dobignard and Chatelain 2011; APD 2020). We report this subspecies from Tunisia for the first time.

Identification. Compared to *M. incana* subsp. *rupestris* (Rafin.) Nyman, *M. incana* subsp. *incana* is densely white-tomentose to subglabrous with the lower leaves 5–22 mm wide (up to 25–40 mm in *M. incana* subsp. *rupestris*) and linear-lanceolate, rarely oblong-lanceolate, obtuse, or subacute. Sepals are 9–13 mm long (versus 11–15 mm in *M. incana* subsp. *rupestris*) (Tutin et al. 1996).

Habitat. *Matthiola incana* subsp. *incana* is a perennial chasmophytic plant in Tunisia that occurs in small populations growing at the Cap-Blanc, Bizerta region, or sometimes with few individuals on old walls of the city (Fig. 2). We consider this species to be a naturalized alien in Tunisia.

Lamiaceae

***Moluccella laevis* L.**
≡ *Molucca laevis* (L.) Moench
≡ *Lamium moluccella* E. H. L. Krause
Figure 1D

New record. TUNISIA **:** Jendouba, Fernana/Bouhertma towards Beja, NW Tunisia; 36°43′17″N, 009°06′25″E; 280 m a.s.l.; 21 Jul. 2018; *R. El Mokni & G. Domina* (El Mokni-FPHB-39/21082018, PAL-Gr, PAL).

Global distribution. *Moluccella laevis* (Bells of Ireland, Shell Flower) native to Turkmenistan, Iran, Iraq, Cyprus, Syria, Lebanon, Palestine, Turkey, and the Caucasus area. It is naturalized in Spain (Dana et al. 2015), Cyprus (Hand 2019), Africa, and North America. In North Africa, *M. laevis* was known only from Morocco as adventitious (APD 2020). We report it for the first time from Tunisia.

Identification. *Moluccella laevis* is distinguished from *M. spinosa* L., the only other Tunisian species in the genus, by the calyx limb, which is thin and membranous, pale green, and not spiny (versus rigid, dark green, and spiny in *M. spinosa*) (Mill 1982). Moreover, *M. laevis* shows persistent "bells"; showy calyxes surround tiny fragrant white flowers. The papery, 2–3 cm bells are densely packed along most of the length of the square stems which may reach 80 cm tall. Clusters of 6–7 cm long leaves alternate between the bells, with pairs of small thorns or spines below each calyx.

Habitat. *Moluccella laevis* is an annual plant that occurs in Tunisia in an large and dense population (ca 35–40 individuals within 8000 m^2) growing in association with spice crops in the Jendouba and Beja regions.

Discussion

Recently, many new records and newly recorded species have been added to the Tunisian flora. We report 10 species and one subspecies herein. Some of these are already known from neighboring countries, mainly Algeria and Libya. In fact, the origins of many of these taxa might be due to passive dispersal from neighboring countries: epizoochory on migratory birds (*Lemna minuta*, *Plantago major* subsp. *intermedia*, and *Ranunculus acris*); by water along rivers in bordering areas in northwestern Tunisia, (*Alisma gramineum*, *Persicaria maculosa*, and *P. senegalensis*), by wind dissemination (*Parietaria cretica*), and by infesting seeds of cultivated crops (*Orobanche Cumana*).

As for *Lysimachia foemina*, we believe that this species is native to Tunisia, as it is in Morocco, but as it is morphologically similar to *L. arvensis* sensu lato, it likely has been confused with related taxa and erroneously identified.

Moluccella L. (Lamiaceae, Lamioideae) is a small genus native to the Iranian–Turonian region and includes eight species. Some of these species (annuals or rarely short-lived perennials) included in the subgenus *Moluccella* have distributions that reach the Mediterranean area (Bendiksby et al. 2011). *Moluccella laevis* was known in North Africa only from Morocco, where it is an alien (status unknown), is reported by us as naturalized for the first time. How this species reached Tunisia remains unknown, but it may have been introduced with agricultural seeds because the region where it was found in abundance is known for having extensive agriculture. As for *Matthiola incana*, which has three subspecies in Mediterranean area but none of them native to North Africa, it was most likely escaped from cultivated specimens.

Acknowledgements

We express our sincere gratitude to the staff of Forestry Service within Bizerta, Beja, Jendouba, Monastir, Nabeul, and Zaghouan regions for their assistance during the field investigations. Our warmest thanks go to Amel Zneidi-Abbes for improving the English.

Authors' Contributions

REM collected part of the material, made identifications, and wrote the draft of the manuscript. GD collected part of the material, identified part of the material, and reviewed the manuscript.

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